Name:

at1119paper: Complete the Square, b = odd (v506)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 47x = -370$$

Add $\left(\frac{-47}{2}\right)^2$, which equals $\frac{2209}{4}$, to both sides of the equation.

$$x^2 - 47x + \frac{2209}{4} = \frac{729}{4}$$

Factor the left side.

$$\left(x + \frac{-47}{2}\right)^2 = \frac{729}{4}$$

Undo the squaring.

$$\begin{array}{ccc} x + \frac{-47}{2} = \frac{-27}{2} & \text{or} & x + \frac{-47}{2} = \frac{27}{2} \\ x = \frac{47 - 27}{2} & \text{or} & x = \frac{47 + 27}{2} \\ x = 10 & \text{or} & x = 37 \end{array}$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 + 59x = 936$$

$$x^2 + 59x + \frac{3481}{4} = \frac{7225}{4}$$

$$\left(x + \frac{59}{2}\right)^2 = \frac{7225}{4}$$

$$\begin{array}{ccc} x + \frac{59}{2} = \frac{-85}{2} & \text{or} & x + \frac{59}{2} = \frac{85}{2} \\ x = \frac{-59 - 85}{2} & \text{or} & x = \frac{-59 + 85}{2} \\ x = -72 & \text{or} & x = 13 \end{array}$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 + 35x = -196$$

$$x^2 + 35x + \frac{1225}{4} = \frac{441}{4}$$

$$\left(x + \frac{35}{2}\right)^2 = \frac{441}{4}$$

$$x + \frac{35}{2} = \frac{-21}{2} \quad \text{or} \quad x + \frac{35}{2} = \frac{21}{2}$$

$$x = \frac{-35 - 21}{2} \quad \text{or} \quad x = \frac{-35 + 21}{2}$$

$$x = -28 \quad \text{or} \quad x = -7$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 - 19x = 330$$

$$x^2 - 19x + \frac{361}{4} = \frac{1681}{4}$$

$$\left(x + \frac{-19}{2}\right)^2 = \frac{1681}{4}$$

$$x + \frac{-19}{2} = \frac{-41}{2} \quad \text{or} \quad x + \frac{-19}{2} = \frac{41}{2}$$

$$x = \frac{19 - 41}{2} \quad \text{or} \quad x = \frac{19 + 41}{2}$$

$$x = -11 \quad \text{or} \quad x = 30$$